PO58 -25008 - NANOEMULSION DELIVERY SYSTEMS: IMPACT OF EMULSIFIER TYPE ON CURCUMIN'S BIOACCESSIBILITY DURING IN VITRO DIGESTION

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Abstract

Nanoemulsions (NE) are a colloidal delivery system with increased interest in food science due to properties such as high encapsulation efficiency, high surface area and control release capacity, improving the bioavailability and stability of lipophilic compounds. Curcumin is a lipophilic compound already used as spice or colorant in food products. Besides, it exhibits a wide range of health benefits such as anti-oxidant, anti-tumoral and anti-inflammatory activities. However, this compound has poor solubility in aqueous solutions and low bioavailability. Therefore, the development of novel delivery systems to improve curcumin's bioavailability is of utmost importance, as well as understanding their behavior in gastrointestinal tract and assessing their safety.

The main objective of this research was to evaluate the influence of two emulsifiers, lecithin (LEC) (bio-based emulsifier) and Tween 80 (TWE) (GRAS emulsifier), in a curcumin-enriched-NE formulation when submitted to *in vitro* digestion and to assess their cytotoxicity. NE were characterized in each step of digestion through size, ζ-potential and morphology. At the end of digestion, free fatty acids (FFA) released and curcumin's bioaccessibility was determined. Cytotoxicity of both NE was evaluated on Caco-2 cell line through the MTT assay.

NE-LEC showed some instability at gastric phase, showing an increase in the particle size. NE-TWE showed to be stable until intestinal phase, where an increase in their particle size occurred. NE-TWE presented a higher concentration of FFA released when compared with NE-LEC, showing that TWE enhanced the lipid digestibility. Despite of difference in FFA released, NE-LEC and NE-TWE presented similar curcumin's bioaccessibility. Both formulations presented high cell viability at all concentrations tested, indicative of low cytotoxicity.

This work contributed to the development of NE with improved curcumin bioaccessibility using only ingredients with GRAS status and to their application in food sector by combining essential data on *in vitro* digestion and safety of different formulations.

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